

REMARKS

Reconsideration of this application as amended is respectfully requested.

THE CLAIMS

Claim 6 has been amended to clarify what information is defined in a database and what information is derived from the information stored in the database. Namely, claim 6 has been amended to clarify the features of the method of the present invention whereby: (i) a plurality of attributes of use and a series product having a collection of the attributes of use are defined in a database; (ii) manufacturing series activities for achieving particular values of the individual attributes of use are defined in the database; and (iii) a manufacturing process for a particular product of the series product is derived by arranging the manufacturing series activities in a prescribed sequence.

In other words, according to the method of the claimed present invention, the attributes of use and the series product are defined in the database (in either order), and the manufacturing series activities are also defined in the database. Then, the manufacturing process for a particular product of the series product is derived by arranging the manufacturing series activities in a prescribed sequence. In this connection, it is noted that the term "defining in a/the database" as recited in amended claim 6 means that the respective data are recorded in a

recording medium such as a hard disk or semiconductor memory, as disclosed in the specification at page 7, lines 19-21. And for this reason, claim 4 has been amended to simply recite that each different one of the products of the series product "has" (as opposed to "is defined by having") at least one different value for at least one of the attributes of use since each different one of the products of the series product is not actually "recorded" in a recording medium.

It is respectfully submitted that the amendments to the claims are clarifying in nature only, and do not raise any new issues which require further consideration on the merits and/or a new search. Accordingly, it is respectfully requested that the amendments to the claims be approved and entered under 37 CFR 1.116.

THE PRIOR ART REJECTION

Claims 2-4, 6, 8 and 9 were again rejected under 35 USC 102 as being anticipated by USP 6,189,980 ("Costanza et al"). This rejection, however, is again respectfully traversed.

As described in the Background of the Invention portion of the specification of the present application, according to the conventional method of managing manufacturing engineering information, product configurations including intermediate products and parts are stored into a database in the form of a bill of material. Conventionally, such a database is expressed in the form of a parent/children relationship with each

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particular product stored as a parent, and input items (for example, parts and works-in-process) for manufacturing the particular product stored as children. The individual routings for manufacturing each particular product are expressed in a separately prepared manufacturing routing table, and the manufacturing engineering information is controlled by combining the bill of material and the manufacturing routing table.

In the conventional database configuration as described above, input items have to be configured for each particular product. See, for example, the left hand side of Reference Figure A attached hereto. As a result, if there is even a slight change to the input items for manufacturing the particular product (A), it is necessary to store an entirely new set of data for the revised produced item (A'). See, for example, the right hand side of Reference Figure A attached hereto. With this structure, duplications of the input items occurs, and when a variety of particular products having slight differences are to be manufactured there is an explosive increase in configuration information and the amount of data stored in the database.

According to the method of the present invention as recited in claim 6, by contrast, (i) a plurality of attributes of use and a series product having a collection of the attributes of use are defined in a database; (ii) manufacturing series activities for achieving particular values of the individual attributes of use are defined in the database; and (iii) a manufacturing process for a particular product of the series product is derived by

arranging the manufacturing series activities in a prescribed sequence. With this structure, the data required for a manufacturing process for producing a particular product is dynamically derived (generated) from the database, when it is needed. In other words, the database includes only a template (i.e., generic structure) of the manufacturing data and its derivation rules. And as a result, the amount of data required to be maintained is kept to a minimum.

Today's manufacturing environment is characterized by faster time-to-market of products and shorter product life cycles. In addition, customers are requiring particular products that fit their particular needs, and customers are varying their specifications over time to reflect changing market conditions.

For example, according to one new production management system called "Japanese Style of Mass-Customization", longer-term production plans are first made with rough specifications, and are then divided into shorter-term production plans whose specifications are clarified over time. At the same time, due to fluctuation of demand and engineering changes, manufacturing results are reflected to the production plans and are rolled as needed so as to ensure a due date by a production scheduler. Thus, it is expected that the inventory system will be adjusted and productivity will be increased. To realize this kind of system, each item (such as a product, a part, a raw material, etc.) is required to be represented with a name of series product and a collection of attributes of use.

In order to meet these demands, the method of the claimed present invention provides a manufacturing system whereby data required for a manufacturing process for producing a particular product is dynamically derived (generated) from a database, when it is needed.

In order to clarify the advantageous effects of the claimed present invention, Fig. 1 of the present application which shows how a product "P" is manufactured from parts a, b, c, d, e, r, s, and t will be explained. In this example, the series product P is defined by having three attributes of use 1, 2 and 3, and the manufacturing process is defined by three series activities of first welding, second polishing and third assembling each for achieving particular values of the individual attributes of use. As shown in Fig. 1, the first welding comprises two types of welding for achieving two different attributes values c and r, the second polishing comprises three types of polishing for achieving three different attribute values 1, 2, and 3, and the third assembling comprises three types of assembling for achieving three different attribute values e, s and t. With this kind of manufacturing process, 18 (i.e., $2 \times 3 \times 3$) kinds of series product "P" can be produced.

In the conventional method of managing manufacturing engineering information, the product "P" needs to be defined with an item code for each of the 18 kinds of the product, such as P1, P2, P3, etc. So, a total 18 item codes need to be defined in the conventional database. In addition, routing data has to be

defined for every each product so that a total of 18 routing data need to be defined in the database according to the conventional method.

By contrast, according to the method of the claimed present invention, a series product "P" and the corresponding attributes of use (1,2,3) are defined in the database to identify each product P. In addition, a total of 8 (i.e., 2+3+3) manufacturing series activities (two in welding, three in polishing, and three in assembling) are also defined in the database. With this structure, 18 products and 18 routings can be derived (generated) with a reduced amount of data. In addition, it is noted that each part (a, b, c, d, e, r, s, and t) can also be defined as a series product in terms of attributes of use, with the data structure being applied recursively for all of these products.

According to the conventional method, moreover, each part structure of each particular product is defined by parent-child relationships as shown in Fig. 4 of the present application. As described hereinabove, if a variation in only one of the parts (a, b, c, d, e, r, s, and t) occurs, it is necessary to store an entirely new set of data for the revised particular product. And as variations continuously develop over time due to changing product specifications to reflect changing market conditions, the amount of data to be stored will explosively increase.

By contrast, with the method of the claimed present invention, the database includes only a template (i.e., generic

structure) of the manufacturing data and its derivation rules, and the data required for a manufacturing process for producing a particular product is dynamically derived (generated) from the database, when it is needed. As a result, the amount of data required to be maintained is kept to a minimum even as product specifications change to reflect changing market conditions.

In the Final Office Action, the Examiner asserts that Costanza "inherently shows defining each product by a specific collection of values of attributes of use and mapping those values to process steps 15 since the product definition is for defining a product of, for example, a certain diameter, and not simply for defining a product based on what processes are available independent of the desired outcome." This assertion, however, is respectfully traversed.

Costanza discloses a system and method for designing a mixed-model manufacturing process wherein "Families of products are defined as groups of products that share at least one process." See column 30, lines 37-38, and see also each of independent claims 1, 4, 16 and 17 of Costanza which all recite defining a plurality of products in terms of a set of processes that results in manufacture of the plurality of products. For example, as described at column 30, lines 39-43 with respect to Table VIII of Costanza, products 1-9 are included in the family of products that utilize processes 1, 6 and 8; products 1-4 and 7-9 are included in the family of products that utilize process 2; products 1-4 are included in the family of products that utilize process 3; and

products 1-6 are included in the family of products that utilize processes 4, 5 and 7. Thus, contrary to the Examiner's assertion, Costanza does not inherently disclose defining each product by a specific collection of values of attributes of use (such as diameter).

It is respectfully submitted that the system and method of Costanza are directed to balancing process resources for each process of a set of processes so that for each process an actual process time is approximately an operational cycle time which is the maximum amount of time that a process can use to produce a unit of a plurality of products, as recited in the claims of Costanza. Nevertheless, as pointed out hereinabove, Costanza clearly discloses that in the system and method thereof, the products are defined in terms of shared processes and not in terms of attributes of use, as according to the claimed present invention.

Accordingly, it is respectfully submitted that Costanza does not at all disclose, teach or suggest the above described features of the claimed present invention whereby: (i) a plurality of attributes of use and a series product having a collection of the attributes of use are defined in a database; (ii) manufacturing series activities for achieving particular values of the individual attributes of use are defined in the database; and (iii) a manufacturing process for a particular product of the series product is derived by arranging the manufacturing series activities in a prescribed sequence.

And it is respectfully submitted that Costanza also does not at all disclose, teach or suggest the above described advantageous effects of the claimed present invention whereby the data required for a manufacturing process for producing a particular product is dynamically derived (generated) from the database, when it is needed, so that the amount of data required to be maintained is kept to a minimum even as product specifications change to reflect changing market conditions.

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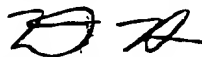
In view of the foregoing, it is respectfully submitted that the method of the claimed present invention patentably distinguishes over the teachings of Costanza under 35 USC 102 as well as under 35 USC 103.

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Entry of this Amendment, allowance of the claims, and the passing of the application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action..

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 4 and 6 have been amended as follows:

4. (Second Amended) The method according to claim 6, wherein each different one of the products of the series product [is defined by having a] has at least one different value for at least one of said attributes of use.

6. (Fourth Amended) A method comprising:

defining in a database a plurality of attributes of use and a series product comprising a set of products which have a collection of said attributes of use [and which are arbitrarily predetermined as a series product];

[defining each product contained in said series product by a collection of values of said attributes of use;]

[setting] defining in the database manufacturing series activities for achieving particular values of the individual attributes of use; and

deriving a manufacturing process for a particular product of the series product by arranging said manufacturing series activities in a prescribed sequence; and

producing the particular product in accordance with the derived manufacturing process.